

In the Claims:

Listing of all claims:

1                   1.     (Currently Amended) A method of MIG welding  
2     comprising:  
3             providing ac power to a weld, wherein the ac power  
4     has a negative portion and a positive portion, and the ac  
5     power further has a frequency;  
6             wherein the negative portion is greater than the  
7     positive portion;  
8             wherein the frequency is at least 60 Hz; and  
9             providing a ~~weld path on at least one workpiece,~~  
10    ~~wherein the weld path includes a groove having an angle of~~  
11    ~~less than 50 degrees~~ consumable, metal-cored, wire to the  
12    weld the wire includes providing a wire wherein the wire  
13    comprises a sheath encapsulating a core having a core  
14    composition, the core composition comprising a combination  
15    of graphite and one or more compounds of potassium, the  
16    combination of graphite and compounds of potassium in the  
17    core composition not exceeding approximately 5% by weight.

1                   2.     (Original)       The method of claim 1, wherein the  
2     frequency is between 90 Hz and 120 Hz.

3-5. (Cancelled.)

1                   6.     (Currently Amended) The method of Claim 1 5,  
2     wherein providing the wire includes providing the wire electrode  
3     wherein the one or more compounds of potassium comprise  $K_2MnTiO_4$ .

1                   7.     (Previously Presented)   The method of Claim 6,  
2     wherein providing includes providing the wire wherein the

combination is selected from the range from about 0.3% to about 5.0% by weight.

8. (Cancelled.)

9. (Original) The method of claim 1, further comprising providing a weld path on at least one workpiece, wherein the weld path includes a groove having an angle of less than 30 degrees.

10. (Original) The method of claim 1, further comprising providing a weld path on at least one workpiece, wherein the weld path includes a groove having an angle of between 20 degrees and 30 degrees.

11. (Original) The method of claim 1, including welding at a rate of at least 35 pounds per hour using a single arc.

12. (Original) The method of claim 11 including welding at a rate of at least 40 pounds per hour.

13. (Original) The method of claim 11 wherein the negative portion is at least twice the positive portion.

14. (Original) The method of claim 10 wherein the negative portion is at least 1.5 times the positive portion.

15. (Original) The method of claim 1 wherein the weld process begins with a first negative portion having a duration of at least 0.5 seconds.

1                   16. (Original)       The method of claim 14 wherein the  
2 weld process begins with a first negative portion having a  
3 duration of at least 0.75 seconds.

1                   17. (Original)       The method of claim 1 further  
2 including providing a stick-out of about 2 inches.

1                   18. (Original)       The method of claim 17 further  
2 comprising providing a shielding gas at a rate of at least 80  
3 cubic feet per hour.

19-48.       (Cancelled.)

1                   49. (Currently Amended) A MIG welding system  
2 comprising:

3                   power means for providing ac power to a weld,  
4 wherein the ac power has a negative portion and a positive  
5 portion, and the ac power further has a frequency; and

6                   control means for controlling the power means,  
7 wherein the negative portion has a negative amp-seconds and  
8 the positive portion has a positive amp-seconds, wherein the  
9 control means causes the negative amp-seconds to be greater  
10 than the positive amp-seconds, and wherein the frequency is  
11 at least 60 Hz, and wherein the weld process begins with the  
12 negative portion of at least 0.5 seconds duration; and

13                   a source of wire comprising a sheath encapsulating  
14 a core having a core composition, the core composition  
15 comprising a combination of graphite and one or more  
16 compounds of potassium, the combination of graphite and  
17 compounds of potassium in the core composition not exceeding  
18 approximately 5% by weight.

1                   50. (Original)       The system of claim 49, wherein the  
2 control means includes means for providing the frequency to be  
3 between 90 Hz and 120 Hz.

1                   51. (Original)       The system of claim 49, further  
2 including a consumable, flux-cored, wire, disposed to be provided  
3 to the weld.

1                   52. (Original)       The system of claim 51, wherein the  
2 wire is metal-cored.

1                   53. (Original)       The system of claim 52, further  
2 comprising a weld path on at least one work piece, wherein the  
3 weld path includes a groove having an angle of less than 50  
4 degrees.

1                   54. (Original)       The system of claim 49, further  
2 comprising a weld path on at least one workpiece, wherein the  
3 weld path includes a groove having an angle of less than 30  
4 degrees.

1                   55. (Original)       The system of claim 54 wherein the  
2 control means for includes means for causing the negative amp-  
3 seconds to be at least twice the positive amp-seconds.

1                   56. (Original)       The system of claim 49 wherein the  
2 control means includes means for causing the negative amp-seconds  
3 to be at least 1.5 times the positive amp-seconds.

                  57. (Cancelled.)

1                   58. (Original)       The system of claim 49 wherein the  
2 control means includes means for causing the weld process to

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begin with a first cycle portion having a duration of at least  
0.75 seconds.

59-79. (Cancelled.)

80. (Original) A method of controlling  
dilution in MIG welding comprising:  
providing ac power to a weld, wherein the ac power  
has a negative portion and a positive portion, and the ac  
power further has a frequency;  
controlling the balance of the negative portion  
and the positive portion to obtain a desired dilution.

81. (Original) The method of claim 80 wherein the  
negative portion is greater than the positive portion.

82. (Original) The method of claim 80 wherein the  
negative portion is less than the positive portion.

83. (New) The method of claim 1, further  
comprising providing a weld path on at least one workpiece,  
wherein the weld path includes a groove having an angle of less  
than 50 degrees.